23 January 1935.

Dr. E. Ashby,
Imperial College of Science,
South Kensington,
S.W.7.

Dear Ashby,

Thanks for the chart showing the relation between the number of empty squares and the estimated plant density. The slight departure from the theoretical curve is exceedingly interesting in its consistency and suggests here that you have in such a departure at least a possible measure of local heterogeneity, which may well be of further interest. As a preliminary empirical measure your data look as though they might fit well the geometrical progression $25r^8$ where r is some number a little bigger than 0.96 or, perhaps, it would be necessary to replace the factor 25 also by an arbitrary constant.

The effect of plant size would be in the opposite direction and where it is appreciable might tend to mask the effect of heterogeneity. I suppose a first allowance could be made by fixing the maximum number of plants of the sizes actually existing could be placed inside the unit square, and if this is j, to replace the Poisson distribution

$$e^{-m}\left(1, m, \frac{m^2}{2}, \ldots\right)$$

by the expansion of the binomial

$$(q + p)^j,$$

where pj replaces m as the average number of plants per square.

I will talk over the heterogeneity problem with Stevens in case he sees that any simple theory would give a correction suitable for your graph.

Yours sincerely,